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## **NUCLEAR WASTE MANAGEMENT PROGRAM PROCEDURE**

### **SP 5-1 ENGINEERING DRAWINGS Revision 0**

**Effective Date:** 05/03/99

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	(printed name)	(signature)	date

## **1.0 Purpose and Scope**

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This procedure prescribes the process for the preparation, review, approval, issuance, and change of NWMP engineering drawings.

This procedure applies to engineering drawings prepared by either SNL or contractor personnel in support of NWMP activities. Requirements for the preparation of drawings are specified in contracts with external contractors, in design plans, or in other controlling documents for NWMP work activities.

Graphical representations used in reports or papers to illustrate a design concept (such as a figure in a SAND report) and which are not intended to be constructed, are not subject to the requirements of this procedure.

Acronyms and definitions for terms used in this procedure may be found in the NWMP Glossary located at the Sandia National Laboratories (SNL) NWMP On-line Documents web site.

## **2.0 Implementation Actions**

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### **2.1 Initiation of Drawings**

The individual with primary responsibility for the project or task, such as the Principal Investigator (PI) Project Lead, or Task Lead, determines when an engineering drawing is to be developed to define a design concept or detail, however, this procedure must be followed for drawings related to structures and components that provide a function in nuclear waste isolation.

### **2.2 Preparation of Drawings**

2.2.1 General. Drawings should be completed in accordance with the drafting standards specified

in the current revision of American Society of Mechanical Engineers (ASME) Y14.2M (Line Convention and Lettering), and shall contain technical detail as specified by the individual with primary responsibility for the project or task. Drawings shall be reviewed for adequacy, correctness, and completeness prior to approval and issuance.

Note: If the scope of work dictates, the functions of PI, Design Engineer, and Draftsperson may be performed by the same individual.

2.2.2 Safety. Drawings shall consider the need to minimize hazards to both the public and operational personnel, e.g., radiation exposure.

2.2.3 Drafting. Upon direction of the individual with primary responsibility for the project or task, the Design Engineer shall perform the design function and provide sufficient direction to the draftsperson for that individual to draft the drawing (the design input may be in the form of a sketch, which results in an engineering drawing if properly drafted, reviewed and approved). Using the design input from the Design Engineer, the draftsperson prepares a check print which is circulated for review.

2.2.3 .1 Drawing Identification. All drawings shall contain a unique identifier (drawing number) and revision number to ensure the drawing is controlled, and configuration control of revisions is maintained. The organization preparing the drawing shall contact NWMP Document Control to obtain a unique drawing number, or if desired, obtain concurrence from Document Control that the external organization's assigned drawing number is authorized for use.

Each drawing shall have a Title Block which contains the following:

- Sandia National Laboratories
- Drawing Title
- Drawing Number
- Effective Date
- Reference to the controlling document for the drawing, e.g., Design Plan (if appropriate)

2.2.3.2 Signature Block.

Each drawing shall contain a Signature Block with the printed name and dated signature of the following individuals:

- Draftsperson
- Checker
- Safety Reviewer
- QA Reviewer
- Design Engineer

## **2.3 Review and Approval of Drawings**

Drawing reviews shall be conducted and documented using the process described in NP 6-1 (Document Review Process). The responsible Design Engineer shall ensure all corrections have been made prior to approving the drawing. The drawing review responsibilities of the Checker, Safety, Quality Assurance, and the Design Engineer are listed below.

**Checker:** Performs an independent technical review of the check print of the drawing to ensure that all information shown is correct, complete, and consistent. The Checker must be technically competent and experienced in the type of engineering being checked, and be an individual other than the Design Engineer. The Checker resolves any conflicts with the Design Engineer, and after necessary corrections to the drawing have been made, signs the drawing.

**Safety:** Reviews the check print of the drawing to ensure safety requirements and considerations are incorporated. The Safety reviewer resolves any conflicts with the Design Engineer, and after necessary corrections to the drawing have been made, signs the drawing.

**Quality Assurance:** Reviews the check print of the drawing to ensure the QA requirements of this and other appropriate procedures have been met. The QA Reviewer resolves any conflicts with the Design Engineer, and after necessary corrections to the drawing have been made, signs the drawing.

**Design Engineer:** Reviews the check print of the drawing for technical adequacy, accuracy, completeness, and to ensure compliance with contractual and other established requirements. The Design Engineer shall resolve the comments of all the other reviewers, and coordinate with the draftsman to ensure necessary corrections are made, and a final drawing is produced. When the Design Engineer has completed all required actions, the Design Engineer shall approve the drawing by signing and dating it.

## 2.4 Issuance and Control of NWMP Drawings

NWMP drawings shall be issued through Document Control. Document Control ensures configuration control by assigning/approving drawing numbers and drawing revision numbers.

After the Design Engineer has verified that all reviewers have signed and dated the Signature Block on the drawing to indicate their concurrence, the Design Engineer shall then approve the drawing by signing and dating it. The Design Engineer shall forward two reproducible copies of the check print and approved engineering drawing to Document Control in accordance with NP 6-2 (Document Control Process). Document Control, with the concurrence of the Design Engineer, shall determine the effective date of the drawing, and forward appropriate copies to the NWMP Records Center.

Note: When an approved NWMP drawing is included as a figure in a SAND report or other document, the figure is controlled as a part of the report, independent from the original drawing.

## 2.5 Editorial Corrections to NWMP Drawings

Editorial corrections to drawings require the approval of QA and the Design Engineer responsible for the drawing. "Editorial Changes" are defined in the NWMP Glossary located at the SNL NWMP On-line Documents web site.

## 2.6 Revising NWMP Drawings

### 2.6.1 General.

Revisions to drawings shall follow the same review process as the original review of the drawing defined in section 2.3 above, and in NP 6-1. The review shall be performed by either the same individuals, or

other individuals performing the same function for the subject drawing, i.e. Checker, Design Engineer, Safety, and QA.

2.6.2 Revision Block.

When a drawing is revised, a Revision Block shall be added above the Title Block to uniquely identify the revision. Revision Blocks shall contain as a minimum, the following:

- Revision Number (sequentially numbered starting with "0" for the original drawing)
- Effective Date of the Revision
- Brief Description of the Revision
- Draftsperson’s printed name and initials
- Checker’s printed name and initials
- Safety Reviewer’s printed name and initials
- QA Reviewer’s printed name and initials
- Design Engineer’s printed name and initials

3.0 Records

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The following QA records, generated through implementation of this procedure, shall be prepared and submitted to the NWMP Records Center in accordance with NP 17-1 (Records):

<u>QA Record</u>	<u>Preparer</u>	<u>Records Submitter</u>
• Check prints	Draftsperson	Document Control
• Approved engineering drawings	Design Engineer	Document Control
• DRC forms	Reviewers	Document Control

4.0 Appendices

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Appendix A: SP 5-1 Process Flow Chart

## Appendix A

### SP 5-1 Drawing Process Flow Chart

